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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,101	02/12/2002	Ian B. Betty	BTW-029	3700

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BOSTON, MA 02109

EXAMINER

SUCHECKI, KRISTYNA

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 07/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/073,101	Applicant(s) BETTY ET AL.	
	Examiner Krystyna Suchecki	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Response filed 02/17/04.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,7,8,10-12 and 16-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,5,7,8,17 and 18 is/are allowed.
- 6) ☒ Claim(s) 10-12 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by K.

Hamamoto et. al. (Electronic Letters).

3. Regarding Claim 10, Hamamoto teaches an integrated optical circuit comprising a semiconductor optical amplifier, and angled output, the angle of which is non-perpendicular with respect to the direction of optical propagation, and an imaging multimode interference device between said semiconductor optical amplifier and said angled output (Figure 1 and page 1219).

4. Regarding Claim 12, Hamamoto teaches an integrated optical circuit comprising a waveguide device, an angled output, the angle of which is non-perpendicular with respect to the direction of optical propagation, and an imaging multimode interference device between said waveguide device and said angled output (Figure 1 and page 1219).

5. Claim 16 is rejected under 35 U.S.C. 102(b) as being anticipated by Ido (US 6,111,998).

6. Regarding Claim 16, Figure 7A of Ido teaches an optical attenuator comprising: an input waveguide (1); an imaging multimode interference device (at 2) adapted to substantially remove all modes but a fundamental mode of an optical signal received from said input waveguide; and an electrode (at 2) adapted to apply a bias voltage to a surface of said imaging multimode

Art Unit: 2882

interference device; wherein said imaging multimode interference device is a l-to-l device having a single input and a single output.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (US 2003/0113063) in view of K. Hamamoto et al.

9. Regarding Claim 11, Liu teaches an integrated optical circuit comprising a semiconductor optical amplifier (202), an output (106B), an imaging multimode interference device (203) between said semiconductor optical amplifier and said output, and an input (106A), said imaging multimode interference device is a first imaging multimode interference device and said integrated optical circuit further comprising a second imaging multimode interference device (201) between said semiconductor optical amplifier (SOA) and said input (Figure 2A).

10. Liu fails to teach either the output or the input as angled non-perpendicular with respect to the direction of optical propagation.

11. Hamamoto teaches an integrated optical circuit comprising a SOA and an imaging multimode interference (MMI) device in optical communication with both a non-perpendicularly angled input and output (Figure 1). The angles are provided as part of a simple structure that enhances the active area of the device while maintaining a regular single-transverse-mode output

Art Unit: 2882

(Page 1219). Hamamoto teaches that using two MMI devices with the SOA increase the active area of the device and therefor increases the gain within the device (Page 1220).

12. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the non-perpendicularly angled input and output waveguides of Hamamoto in the device of Liu for the benefit of using a simple structure that enhances the active area of the device while maintaining a regular single-transverse-mode output (Hamamoto , Page 1219) and increasing the gain within the device (Hamamoto, Page 1220).

Allowable Subject Matter

13. Claims 1, 5, 7, 8, 17 and 18 are allowed.

14. The following is a statement of reasons for the indication of allowable subject matter:

Claims 1 and 5 contain allowable subject matter for at least the reason that the prior art of record fails to teach or reasonably suggest an integrated optical circuit, or method for suppressing propagating lateral waveguide field oscillations at the input of an optical power splitter structure, comprising an imaging multimode interference device connected to an optical power splitter and dump port as claimed. Claims 5, 7 and 8 contain allowable subject matter at least by virtue of their dependency.

Response to Arguments

15. Applicant's arguments, see Response, filed 02/17/04, with respect to Claims 1, 5, 7 and 8 have been fully considered and are persuasive. The rejection of claims 1, 5, 7 and 8 has been withdrawn.

16. Applicant's arguments with respect to the rejection(s) of claim(s) 10-12 under Ito have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

Art Unit: 2882

However, upon further consideration, a new ground(s) of rejection is made in view of K.

Hamamoto and Liu.

17. Applicant's arguments with respect to the rejection(s) of claim(s) 16 under Joyner have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

However, upon further consideration, a new ground(s) of rejection is made in view of Ido.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patent to Hosoi (US 6,668,103) is of interest for teaching a power splitter structure in optical communication with an MMI device. The splitter structure recombines at the MMI, however, and no suggestion is made to move the splitter structure to the output of the MMI. Hosoi also teaches a dump port in optical communication with an output side of an MMI device.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krystyna Suchecki whose telephone number is (571) 272-2495. The examiner can normally be reached on regular working days and hours.

20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


21. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

Art Unit: 2882

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER